



# **Post Carbon Cities:**

Planning for Energy and Climate Uncertainty

## Bank says Saudi's top field in decline

by Adam Porter in Perpignan, France  
Tuesday 12 April 2005 10:10 AM GMT

Speculation over the actual size of Saudi Arabia's oil reserves is reaching fever pitch as a major bank says the kingdom's - and the world's - biggest field, Ghawar, is in irreversible decline.

The Bank of Montreal's analyst Don Cox, working from their Chicago office, has told the investment number-cruncher to say that Ghawar's days are fated.

Coxe uses the phrase "Hubbert's Peak" to describe the situation. This refers to the seminal geologist M



## Opec warns oil prices could rocket to \$500 a barrel

belfasttelegraph.co.uk

Monday, 28 July 2008

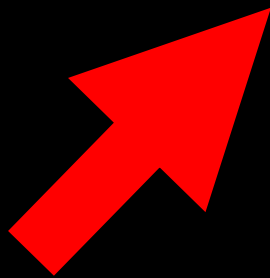
The nightmare scenario of oil reaching \$500 a barrel has been raised at the weekend by a member of OPEC's governing council.

The world's oil prices have risen from current prices and could any time see OPEC's oil prices under control.

Such a rise would also pose a serious threat to economic growth in oil importing countries.

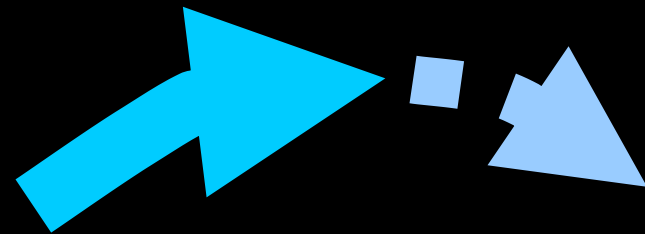
The fundamental factors of oil supply and demand are changing.

**Demand is RISING...**



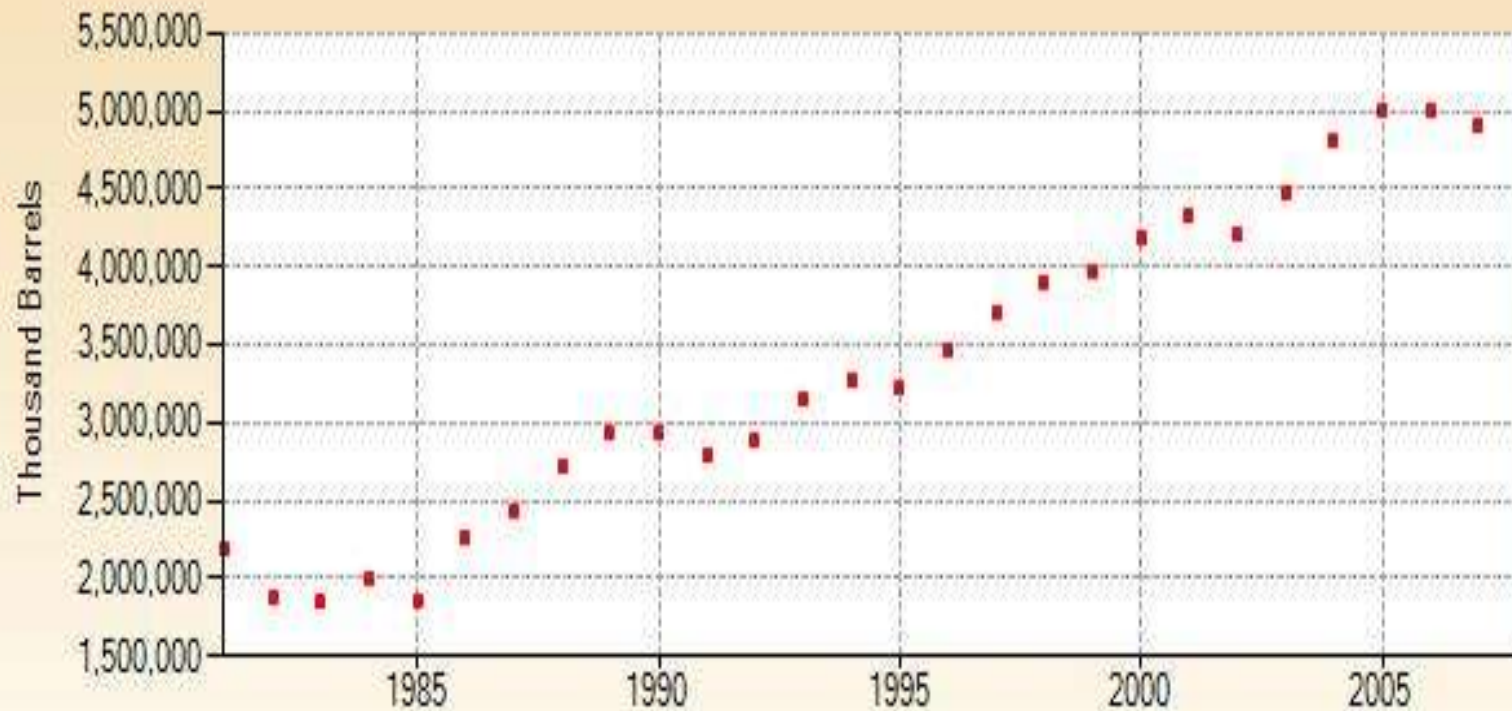
- Developing world is rapidly industrializing (China, India)
- Western world demand growth

**...but Supply is LEVELLING, and will soon fall.**

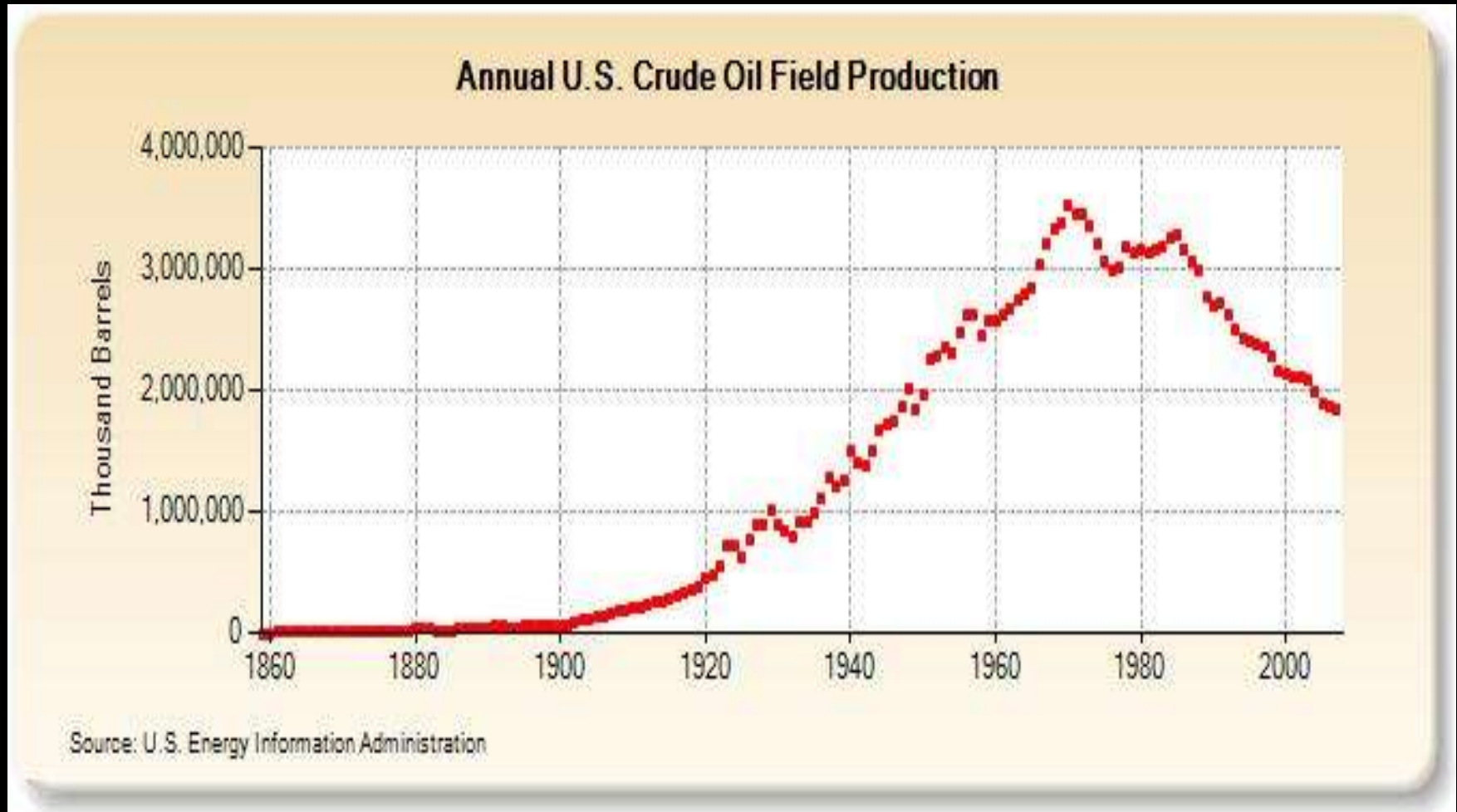


- The "easy oil" is gone
- Logistical (financial) limits to what can ultimately be produced

## Annual U.S. Crude Oil and Petroleum Products Imports from All Countries

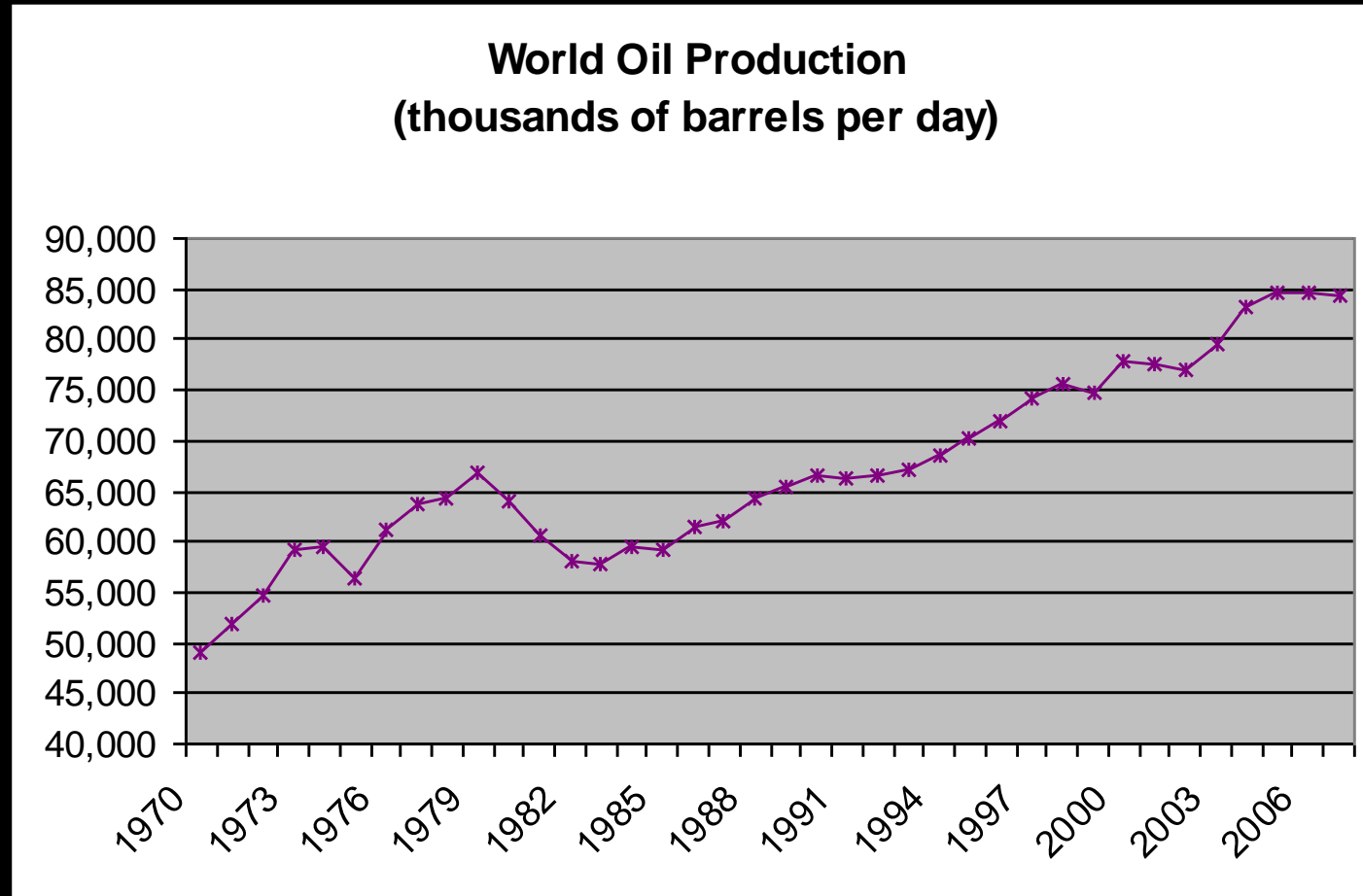


Source: U.S. Energy Information Administration





# Worldwide Oil Production will peak soon, if it hasn't already

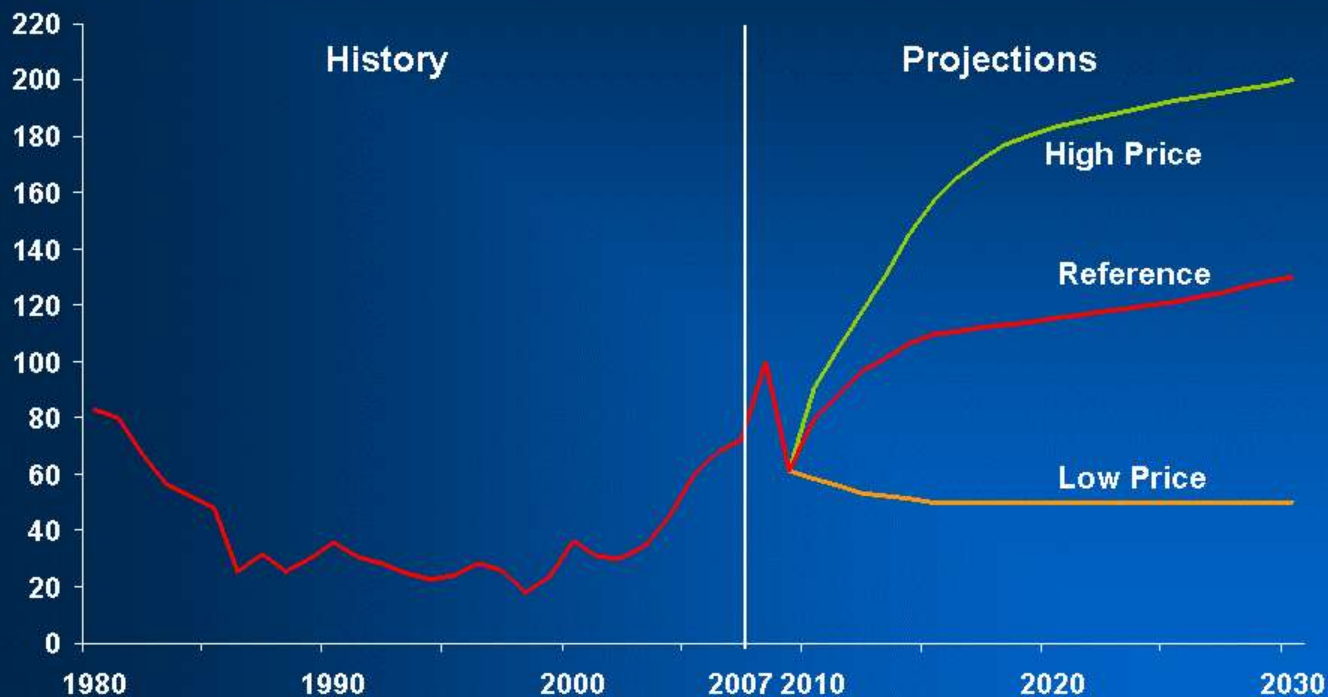




U.S. Energy Information Administration, Annual Energy Overview 2006, p.64

***Oil prices in the reference case rise steadily; the full AEO includes a wide range of price cases***

2007 dollars per barrel



EIA Annual Energy Outlook 2009 Reference Case Presentation -- December 17, 2008



3

...which means we can no longer rely on the usual 'experts'...

**CNNMoney.com**  
A Service of CNN, Fortune & Money

## Why oil won't hit \$100

By **Steve Hargreaves**, CNNMoney.com staff writer  
August 7 2007; 1:17 PM EDT

NEW YORK (CNNMoney.com) -- Despite oil's record high last week, forget about crude going to \$100 a barrel.

Prices have already dropped about 7 percent since last week, and are likely to fall even more in the coming years.

That's the consensus of analysts who say rising production, the advent of biofuels, and conservation measures will likely lead to lower oil prices by 2015.



Crude may not reach \$100 a barrel, but don't look for \$20 either.

[http://money.cnn.com/2007/08/07/news/economy/cheap\\_oil/index.htm](http://money.cnn.com/2007/08/07/news/economy/cheap_oil/index.htm)



...but fortunately, more and more leaders do see the problems ahead...

## HOUSTON★CHRONICLE

By STAFF, Wednesday November 21, 2007

...Monday, in a front-page article, The Wall Street Journal reported that many Western oil industry executives have come round to that view. After years of discounting predictions of peak oil production, these industry leaders and

oil production will plateau during or before 2012.

[www.chron.com/CDA/archives/archive.mpl?id=2007\\_4465038](http://www.chron.com/CDA/archives/archive.mpl?id=2007_4465038)



“[T]here is growing concern that the supply of oil **may soon peak** as consumption continues to grow, known supplies run out and new reserves become harder to find.”

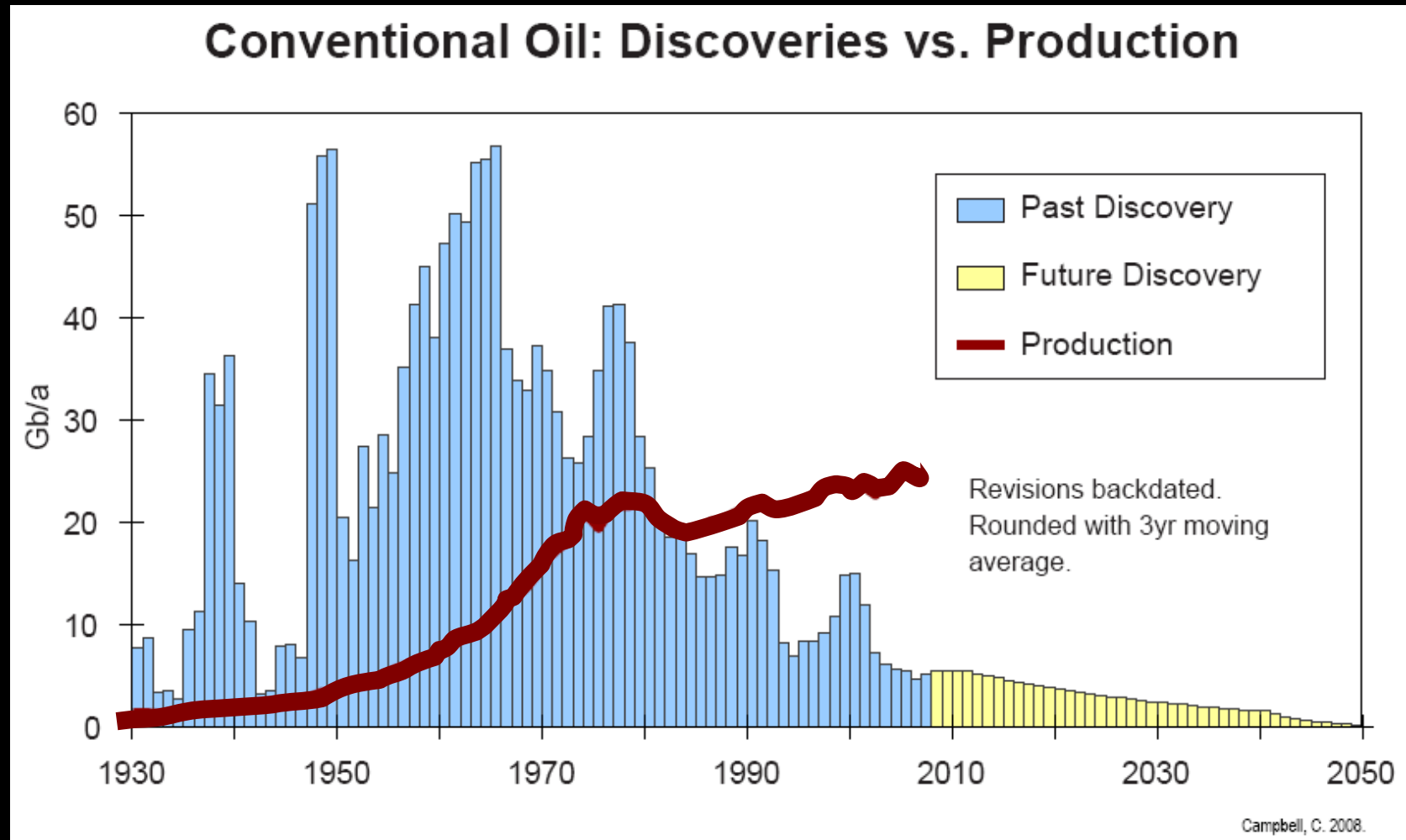
- **21 June 2008** issue of *The Economist*

***“Plateau” ? “Peak” ? Does it matter?***

## *A Very Brief Summary of the Peak Oil Problem*

(in three points)

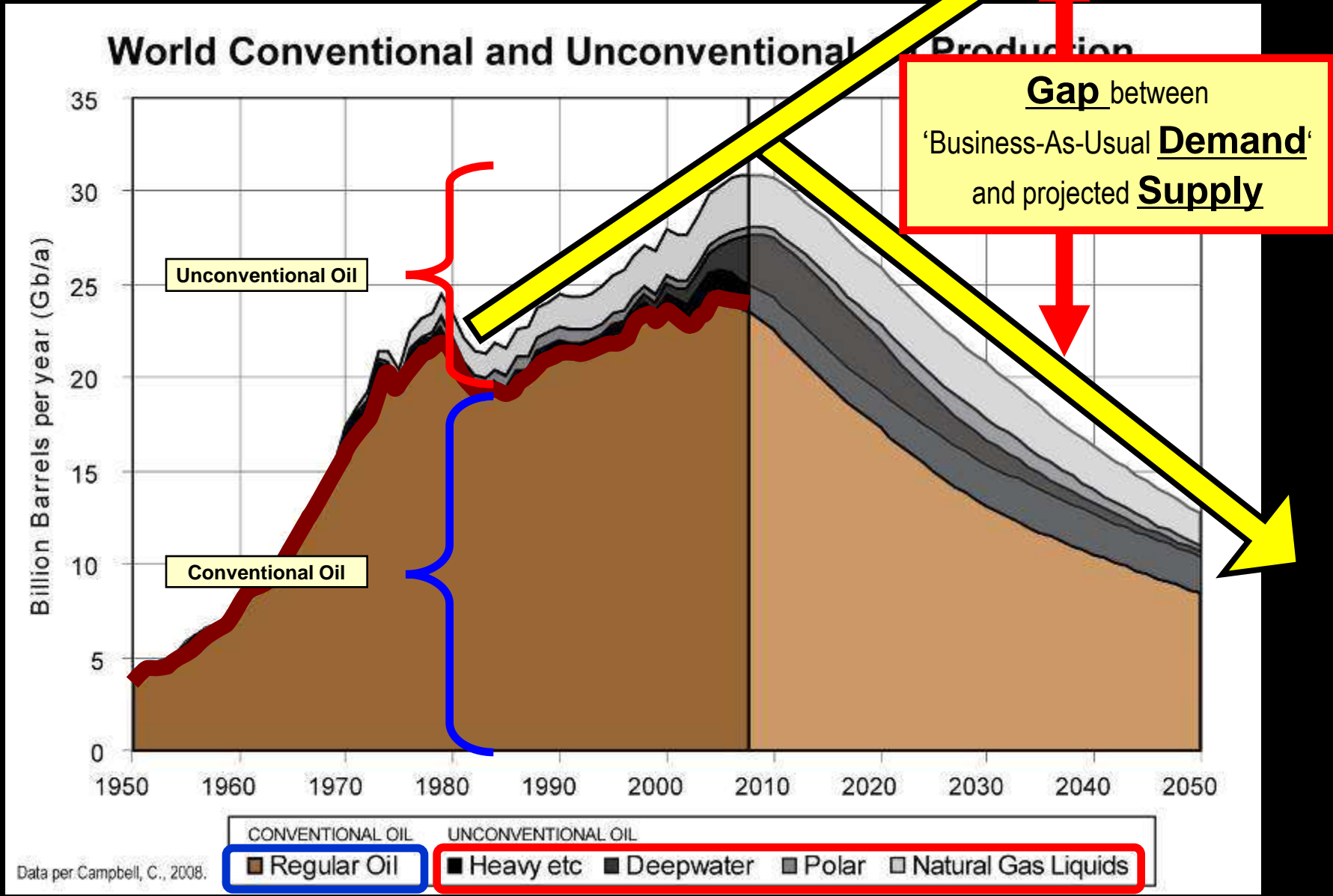
1. The era of “easy oil” is over. Discoveries peaked in the 1960s, production is plateauing now.





# What's happening?

## 2. The “difficult oil” won't fill the gap.



## 3. There are no good substitutes available.

**There is *nothing* of comparable versatility and quantity ready to replace oil.**

**BIOFUELS**

**COAL**

**NUCLEAR**

**HYDROGEN**



**“Oil makes it possible to transport food to the ...megacities of the world.**

**“Oil also provides the plastics and chemicals that are the bricks and mortar of contemporary civilization...”**

–Daniel Yergin, *The Prize: The Epic Quest for Oil, Money, and Power*. 1991.

Image credits clockwise from upper left: Tony Tremblay (istock), caribb (cc), sillydog (cc), IRRI Images (cc)

*Higher Oil Prices + Declining Supply + Rising Demand = Oil Price / Supply volatility*



***This complicates our assumptions  
that oil will continue to be...***



***...available...***



***...and affordable.***



## *What does this mean for government decision-makers?:*

### Peaking of World Oil Production: Impacts, Mitigation and Risk Management

Prepared for the U.S. Department of Energy  
by Robert Hirsch, SAIC, et al, 2005



- "Timely, aggressive mitigation..."
- At least "a decade of intense, expensive effort"
- Intervention by governments because the economic & social implications "would otherwise be chaotic"

*Why is this a problem at the local level?*

(in three points)

## High price of asphalt puts brakes on paving projects



## 2. Potential for shortages and emergencies

guardian.co.uk

Factories close, supermarkets empty and jets run out of fuel as truckers' strike bites

- Spain promises tough response despite deaths
- Britain on alert as action threatens to

The Guardian, Thursday June 12 2008

Strike action by thousands of Spanish and ominous knock-on effects on food supplies. Lisbon airport ran out of fuel, car factories and supermarkets reported shortages.

<http://www.guardian.co.uk>

**Know your municipality's vulnerabilities, because there isn't necessarily anyone else thinking about them.**

“... reported shortages.”

“...airport ran out of fuel...”

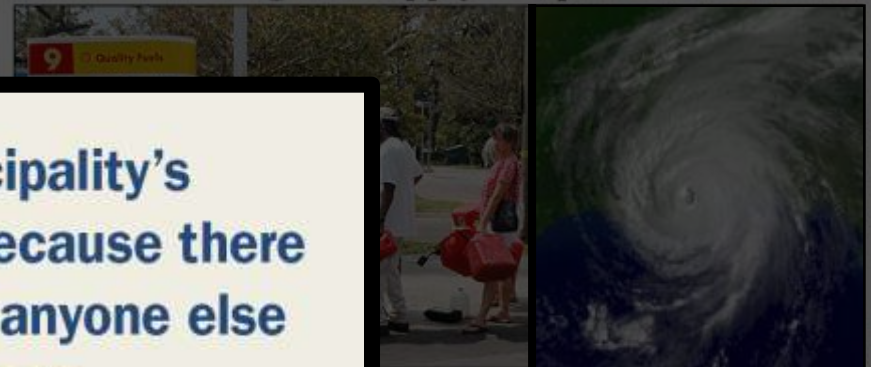
“...factories shut down...”

The Guardian, 12 June 2008

The New York Times

Business

Gas Prices Surge as Supply Drops



Kari Goodnough/Bloomberg News

oil containers on Wednesday. Some states reported scattered shortages. The government asked the states to use oil from the strategic petroleum

By JAD MOUAWAD and SIMON ROMERO

Published: September 1, 2005

For the first time since the 1970's, gasoline lines reappeared yesterday in some corners of the country.

The New York Times, 1 September 2005



## 3. Long-term economic shifts

- How will the **global economy** adjust?  
*(global trade flows)*
- How will this impact **regional and local economies**?  
*(relative advantage; provisioning systems)*



## How can cities...

- set meaningful budgets
- make long-range land use and transportation plans
- serve residents and the local business community

...with such uncertainty surrounding the most important material to our global, regional and local economies?



***“Energy Uncertainty”***

## ***CAUSES: The debate is over...***

**“For us, as a company, the scientific debate about climate change is over. The debate now is about what we can do about it.”**

**- Jeroen van der Veer, Chief Executive, Shell**

[http://www.shell.com/home/content/responsible\\_energy](http://www.shell.com/home/content/responsible_energy)

**URGENCY:** ...changes are already happening...

THE  
INDEPENDENT

## Exclusive: The methane time bomb

By Steve Connor, Science Editor  
Tuesday, 23 September 2008

The first evidence that millions of tons of a greenhouse gas 20 times more potent than carbon dioxide is being released into the atmosphere from beneath the Arctic seabed has been discovered by scientists.

*The Independent* has been passed details of preliminary findings suggesting that massive deposits of sub-sea methane are bubbling to the surface as the Arctic region becomes warmer and its ice retreats.



ALAMY

*Preliminary findings suggest that massive deposits of subsea methane are bubbling to the surface as the Arctic region becomes warmer and its ice retreats*

<http://www.independent.co.uk/environment/climate-change/exclusive-the-methane-time-bomb-938932.html>



# The “Climate-Peak Convergence”

## PEAK OIL

### WHAT'S THE ISSUE?

1. The easy oil is gone.
2. The ‘difficult’ oil can’t make up the difference.
3. There are no good substitutes.

### WHY IS THIS A PROBLEM?

- Price volatility of goods
- Potential for emergencies  
(unexpected price changes, occasional shortages)
- Long-term challenges  
(how will global, regional and local economies respond?  
how can municipalities budget and plan?)

## GLOBAL WARMING

### WHAT'S THE ISSUE?

1. We know that some effects are inevitable in the short term.
2. We don't know exactly how the global ecosystem will change in the long term.

### WHY IS THIS A PROBLEM?

- Dependence on global ecosystem
- Short-term challenges  
(dealing with first effects)
- Long-term challenges  
(long-term changes to climates and economies)

***“Energy and Climate  
Uncertainty”***

# What are cities already doing?

ENERGY

Table 2:

Selected Municipal and Regional Agency Responses to Peak Oil/Gas (per mid-2007)



Franklin Town, New York  
2,546

Passed resolution 6 December 2005 creating a Citizens' Commission to examine the issues raised by declining energy supplies and rising energy costs.

## Portland (Ore.) Peak Oil Task Force

- 12 members vetted by City Council
- Split up into four subgroups:

Land Use /  
Transportation

Economy

Public and  
Social Services

Food &  
Agriculture

- In 6 months, meetings with over 80 stakeholders



## *Impacts and Vulnerabilities*

Land Use /  
Transportation

Economy

Public and  
Social Services

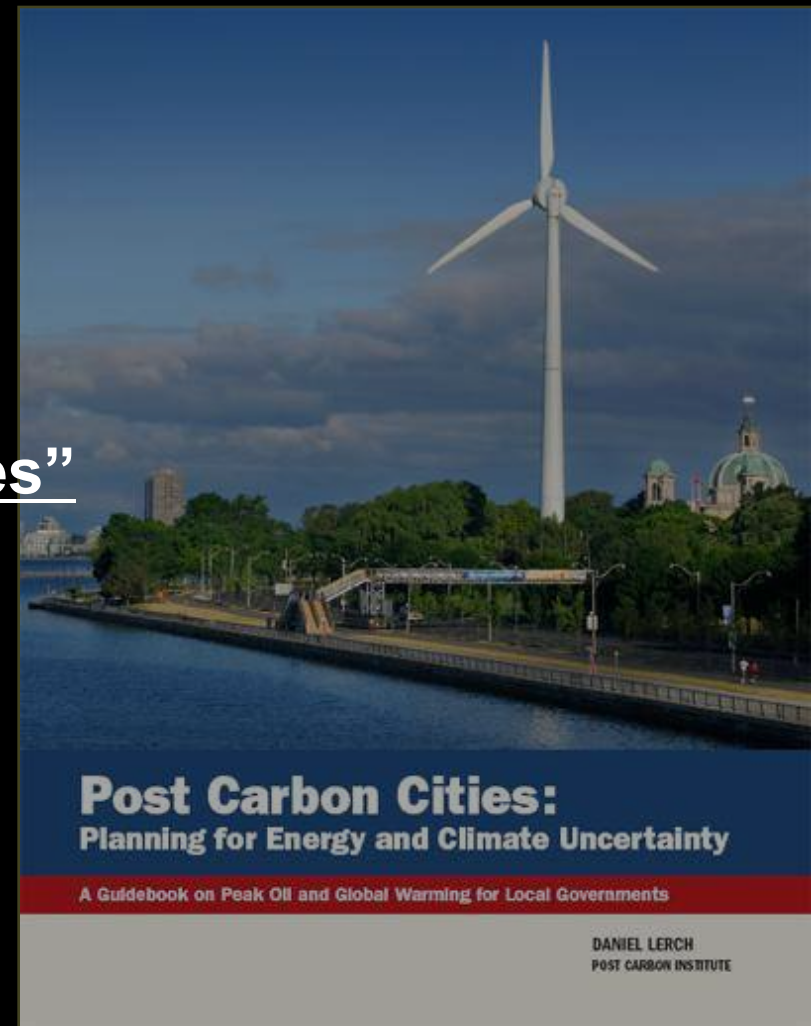
Food &  
Agriculture

## *Two Pillars and 11 Recommendations*

**Reduce  
Exposure**

**Strengthen  
Community**

## The “Five Long-term Principles”





## 1. Deal with transportation and land use (or you may as well stop now).



The built-in oil dependency of our cities and suburbs is the biggest obstacle to significantly reducing our energy use.

Incorporate peak oil and climate change in your long-range land use and transportation planning assumptions now. Don't just tinker with zoning codes and transportation funding—take the time and commit the resources to make serious changes:

- Fundamentally rethink your municipality's land use and transportation practices, from building and zoning codes to Are your regulations and procedures encouraging developers to build buildings and neighborhoods for a world without cheap oil? Are you encouraging kinds of developments that will function poorly when gasoline is as expensive as today?





## 2. Tackle private energy consumption.

- Use the tools you already have to encourage serious energy conservation and efficiency in the private sector. Create strong incentives and support for innovations like zero-energy buildings<sup>63</sup>, combined heat and power (CHP) systems, and industrial symbiosis<sup>64</sup>. Lead by example in your public projects and public-private partnerships.
- Engage the business community aggressively. Resource efficiency saves money, and new "green" industrial and business practices are a growing opportunity for economic development. Challenge your local business leaders to reinvent the local economy for the post-carbon world.



Zero-energy housing, Germany

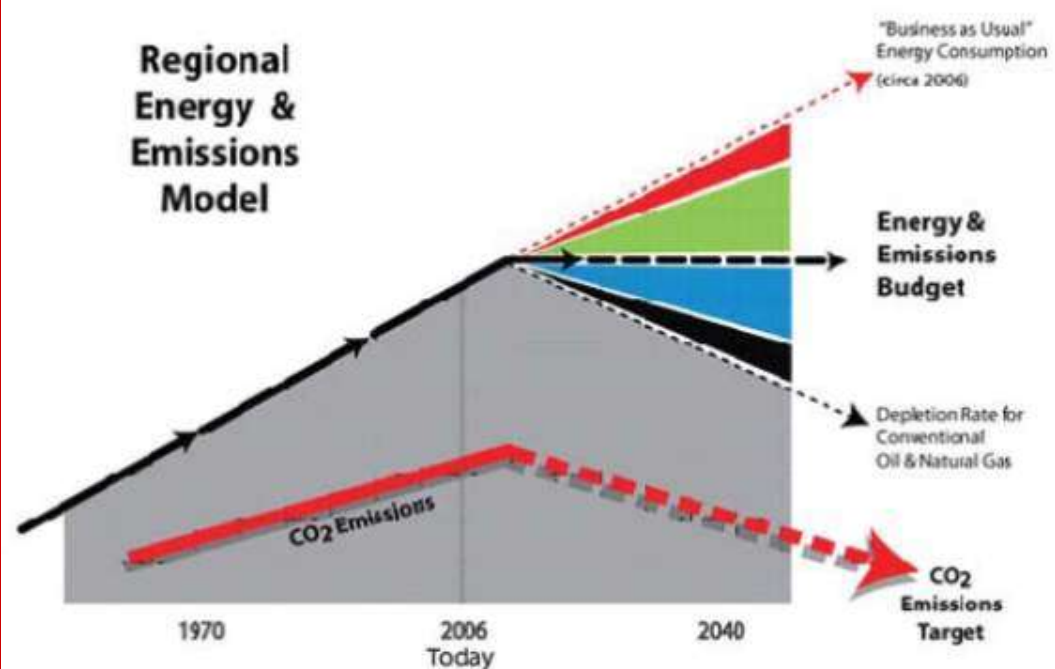
**We're building buildings with 50 year lifespans. We can make decisions for the long term and lead by example, and change the private sector.**

- Mayor Derek Corrigan, City of Burnaby, British Columbia





## 3. Attack the problems piece-by-piece and from many angles.



- Meet your goals with multiple "fixes" on energy and greenhouse kinds of solutions at different scales, leading to rethinking the fundamental
- Enlist the entire community. Success requires action from all sides—supply and demand, government and business—to meet them.



### Demand-Side Mitigation Wedges

-  Demand Destruction (Reactive: Higher Prices & Shortages)
-  Demand Reduction (Proactive: Policy & Design)

### Supply-Side Mitigation Wedges

-  New Clean Energy Supply (Carbon Neutral & Sustainably Sourced)
-  New Dirty Energy Supply (Lowest Price)

GRAPHIC: B. Davidson.

## 4. Plan for fundamental changes... and make fundamental changes happen.

- Educate and involve your fellow elected officials and staff energy and climate uncertainty, and the need to change their accordingly. These are the people who will be guiding your coming crises: raise their awareness of the problems and they to come up with the solutions.
- Educate and involve your stakeholders, which include business developers, planners, architects, landowners, financiers, engineers and citizens. Make sure they understand the seriousness of the challenge them to come up with serious solutions.
- Lead your city's transition by integrating peak oil and climate in your own decision-making. See to it that every project you smooths the transition and reduces energy and climate vulnerability.



(cc) Robert Whitlock / flickr



(cc) citizenhelder / flickr

## 5. Build a sense of community.



Neighborhoods with a strong sense of community are usually the ones that fare best in the long run: citizens, businesses and local institutions help each other weather short-term challenges, and they organize to meet long-term challenges. The knowledge, skills, experiences, and social capital of a strong community contribute more to a city's resilience over time than any multi-million dollar infrastructure project.

More than anything else, the resilience that comes from a strong sense of community will help your city meet the challenges of energy and climate uncertainty.



## 5. Build a sense of community.



**Build a sense of community throughout your city's neighborhoods:**

- strengthen the city's neighborhood associations;
- protect neighborhood-scale schools, and set up community-school partnership programs
- allow a mix of uses in both buildings and neighborhoods;
- protect affordable housing, and allow accessory dwellings ("granny flats");
- develop a community policing program;
- encourage street fairs and farmers markets;
- build public squares to encourage public interaction;

In short, do anything you can to get people talking with each other, forming relationships, and investing themselves in the larger community.

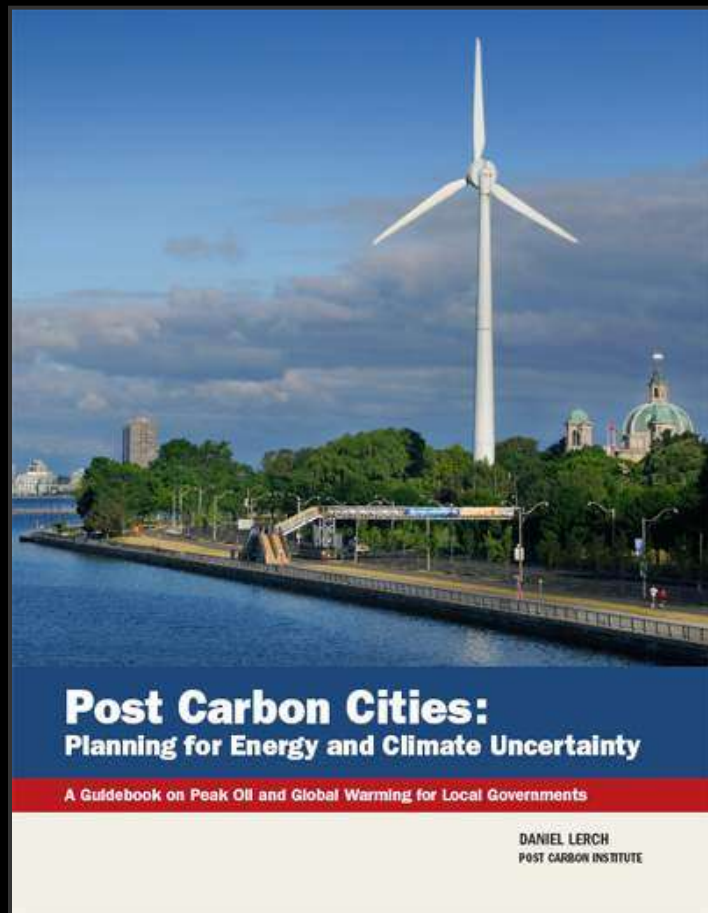


# Post Carbon Cities guidebook



To break dependence on oil, stop contributing to global warming, and build resilient cities that can thrive in the new urban age of energy and climate uncertainty, the bottom line for local governments is this: “Reduce consumption, and produce locally.”





113 pages, \$30.00

2<sup>nd</sup> printing May 2008

[www.postcarboncities.net](http://www.postcarboncities.net)

***The first major guidebook  
for local gov't on peak oil  
and global warming.***

Discusses:

- What are the challenges?
- Why should local governments act?
- What should local governments do?

## Next Steps for WeCAN / Westfield?

- Research the issues with objectivity, discarding old assumptions
- Consider what WeCAN / Westfield can and should do

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